**Lecture 17………Physiology……… Sara Htif**

**Functions of the Digestive System**

**Ingestion**:- the oral cavity allows food to enter the digestive tract and have mastication (chewing) occurs , and the resulting food bolus is swallowed .

**Digestion**:

**Mechanical digestion** – muscular movement of the digestive tract (mainly in the oral cavity and stomach) physically break down food into smaller particles .

**chemical digestion** – hydrolysis reactions aided by enzymes (mainly in the stomach and small intestine) chemically break down food particles into nutrient molecules , small enough to be absorbed .

**Secretion** – enzymes and digestive fluids secreted by the digestive tract and its accessory organs facilitate chemical digestion .

**Absorption** – passage of the end – products (nutrients) of chemical digestion from the digestive tract into blood or lymph for distribution to tissue cells .

**Elimination** – undigested material will be released through the rectum and anus by defecation .

Organs of the digestive system are divided into 2 main group :

the gastrointestinal tract (GI tract) and accessory structures .

GI tract is a continuous tube extending through the ventral cavity from the mouth to the anus – it consists of the mouth , oral cavity , oropharynx , esophagus , stomach , small intestine , large intestine , rectum , and anus .

Accessory structures include the teeth, tongue (in oral cavity) , salivary glands , liver , gallbladder , and pancreas .

**Mouth & Oral Cavity**

♣ Food enters the GI tract by ingestion .

♣ Food is broken down by mechanical digestion , using mastication .

♣ One chemical digestive process occur where amylase enzyme in saliva breaks down polysaccharide into disaccharides .

**The tongue** :- made of skeletal muscle, manipulates the food during mastication . it also contains taste buds to detect taste sensations(intrinsic) .

Food particles are mixed with saliva during mastication , resulting in a moist lump called bolus for easier passage into or pharynx .

**Salivary Glands**

♣ 3 pairs of salivary glands called parotid , submandibular , and sublingual gland secrete most of the saliva in the oral cavity , using salivary ducts .

♣ Saliva helps moisten the food during mastication , dissolve the food in forming the bolus , and help cleanse the teeth.

♣ Saliva consists of 99.5% water , the remaining 0.5% is dissolved substances including amylase enzyme (for chemically digesting carbohydrate ), bicarbonate ion (HCO3 - ; maintains pH of saliva at 6.5-7.5) , and many electrolytes.

**Pancreas :-** most pancreatic enzymes are produced as inactivate molecules , or zymogens , so that the risk of self – digestion within the pancreas is minimized .

♣ More than 98% of the pancreas mass is devoted to its exocrine function: the secretion of pancreatic juice by the pancreatic acini and their ductile cells. Ductile cells produce Sodium bicarbonate which helps neutralize the acidic gastric contents ♣ Acinar cells of the exocrine pancreas produce a variety of digestive enzymes to break down food substances into smaller absorbable molecules .

♣ Only 2% of pancreas mass is devoted to the islets of langerham , which produce insulin and glucagon , hormones that regulate blood sugar and carbohydrate metabolism (they have opposite effects) .

**Major pancreatic Enzymes**

♣ -pancreatic amylase: digest polysaccharides into disaccharides

♣ - pancreatic lipases digest triglycerides into fatty acids .

♣ - pancreatic nucleases digest nucleic acids into nucleotides .

♣ -Pancreatic proteinases (all secreted in their inactive forms) digest peptides into amino acids: